Arctic User's Manual

Arctic 3G Lite, Arctic LTE Lite (C-1230, C-1240, C-1260)

Firmware Version 3.0.2
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declares that this product:

Product Name:

Arctic 3G Lite and Arctic LTE Lite

conforms to the following standards:

EMC:

EN 55022 Emission Test (Class A)

1. Radiated Emissions (30-1000MHz)
2. Conducted Emissions (0.15-30MHz)

EN 50082-1 Immunity Test

1. IEC 801-3: Radio Frequency Electromagnetic Field
2. IEC 801-2: Electrostatic Discharge
3. IEC 801-4: Fast Transients, AC Power Ports and Signal cables

Supplementary Information:

"The product complies with the requirements of the Low Voltage Directive 73/23/EEC and EMC directive 89/336/EEC."

Note!
This is a Class A product. In a domestic environment this product may cause radio Interference which may make it necessary for the user to take adequate measures.

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Warranty and Safety Instructions

Read these safety instructions carefully before using the products mentioned in this manual:

Warranty will be void if the product is used in any way in contradiction with the instructions given in this manual or if the product has been tampered with.

The devices mentioned in this manual are to be used only according to the instructions described in this manual. Faultless and safe operation of the devices can be guaranteed only if the transport, storage, operation and handling of the devices is appropriate. This also applies to the maintenance of the products.

To prevent damage both the product and any terminal devices must always be switched OFF before connecting or disconnecting any cables. It should be ascertained that different devices used have the same ground potential. Before connecting any power cables the output voltage of the power supply should be checked.

This product is not fault-tolerant and is not designed, manufactured or intended for use or resale as on-line control equipment or as part of such equipment in any hazardous environment requiring fail- safe performance, such as in the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines, or weapons systems, in which the failure of Viola Systems manufactured hardware or software could lead directly to death, personal injury, or severe physical or environmental damage.

Revisions

Date	Document version	Firmware version	Description of changes
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1 Introduction

Viola Arctic product family offers industrial quality connectivity devices for custom-built wireless and wired device management solutions.

1.1 About this User's Manual

This User's Manual describes the operation of the Arctic 3G Lite and Arctic LTE Lite. All devices in this User's Manual are referred to as Arctic, unless otherwise mentioned. This manual provides introductory information as well as detailed instructions on how to set up and manage the Arctic as part of a network environment. It is intended for anyone involved in installing and managing Arctic devices. It is assumed that the reader of this manual is familiar with basic working principles of Internet technology.

Figure 1. *Arctic 3G/LTE Lite*

1.2 The Arctic Platform

The Arctic platform utilizes a number of wireless or fixed line interfaces depending on your specific requirements. Arctic is a customizable technology allowing users to develop solutions for their own applications. Arctic devices have been designed to withstand the requirements of extreme environments and industrial use.

Technical Features Summary

The following are the functional components in the Arctic device.

Details of the each components are listed below:

HARDWARE

CPU Platform:

- 32-bit RISC microcontroller
- 128 MB RAM
- 128 MB FLASH memory

Network Interface:

- 10/100 Base-T Ethernet (RJ45)

Device Interface:

- 2 Serial ports (RS-232, RS-485)

Mechanics:

- Aluminum frame
- Attachment rail for optional and custom mounting tools

SOFTWARE

Operating System:

- Linux

Supported Protocols:

- PPP, IP, ICMP, UDP, TCP, ARP, DNS, DHCP, FTP, TFTP, HTTP

Application Services:

- HTTPS server, CGI
- FTP client
- SSH server and client
- OpenVPN
- IPsec
- Temperature sensor
- Real Time Clock
- Syslog
- DHCP server and client
- Status querying using SMS

Management and Configuration:

- Web user interface
- Console port

2 Physical Interfaces

The Arctic unit contains three panels for interface connections and status indication. These panels are:

1. **Front panel:**

   The front panel configuration is shown in *Front Panel Description* on page 11. This panel includes all connectors and switches for the device operation, optional input/output connectors and the connectors for network and serial interface.

2. **Back panel:**

   The wireless network antenna connector and SIM card holder are shown in *Back Panel Description*.

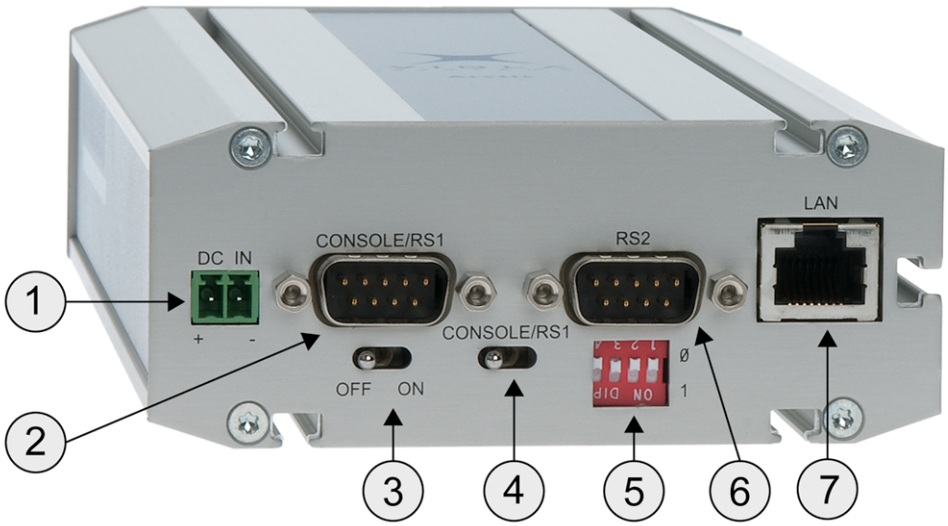
3. **Side panel:**

   The side panel as shown in *Side Panel Description* on page 13 contains all LEDs which indicate the status of the device.

2.1 Front Panel Description

The front panel of the Arctic consists of the following connectors and switches:

Figure 2. *Front Panel Description*



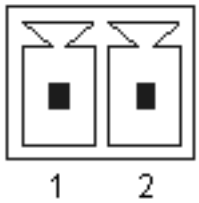
1. Power supply connector
2. Console serial port (RS1)
3. Power switch
4. Console switch
5. DIP switches
6. Application serial port (RS2)
7. Ethernet connector

The Arctic has rails to enable wall or DIN rail mounting. The front panel contains slots for nuts or other mounting accessories (optional) in order to gain access to these rails.

Power Supply Connector

The Arctic has a 12–48 VDC power supply connector as shown in the figure below.

Figure 3. *Power supply connector*



- Pin 1 is positive (+)
- Pin 2 is negative (–)

The unit is protected against reversed polarity.

Power Switch

Enables or disables the operation of the Arctic.

Ethernet Connector

Arctic has an RJ45 connector for 10/100 Mbps Ethernet connection. Maximum length of the Ethernet cable is 100m.

The figure and pin description of the Arctic's RJ45 Ethernet connector is as follows:

Figure 4. *RJ45 Ethernet connector*

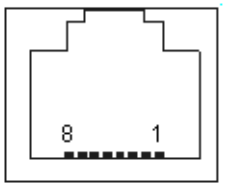


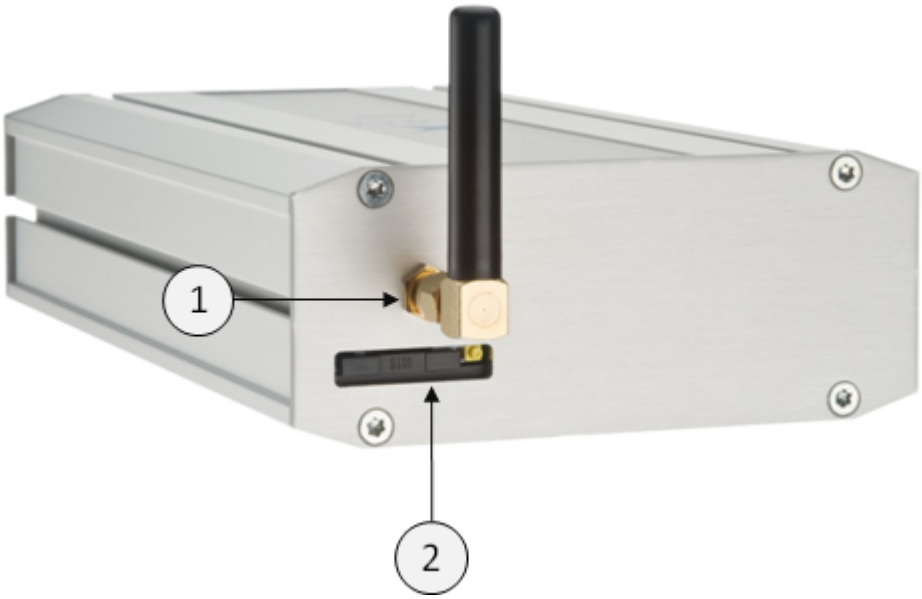
Table 1: RJ45 Ethernet connector PIN Description

Pin Number	Name	Direction	Explanation
1	Rx+	IN	Data Receive Positive
2	Rx–	IN	Data Receive Negative
3	Tx+	OUT	Data Transmit Positive
4	NC	-	-
5	NC	-	-
6	Tx–	OUT	Data Transmit Negative
7	NC	-	-
8	NC	-	-

2.2 Back Panel Description

The Arctic has an antenna connector and a slot for a SIM card on the back panel.

Figure 5. *Back Panel*



1. SMA connector for an antenna.
2. SIM Card slot.

2.3 Side Panel Description

The side panel of the device contains ten LEDs which are used to indicate the status of the Arctic and only five of them are connected. The LEDs are numbered from 1 to 10 starting from the rear panel side. A detailed description of each LED is listed below:

Figure 6. *LED Description*

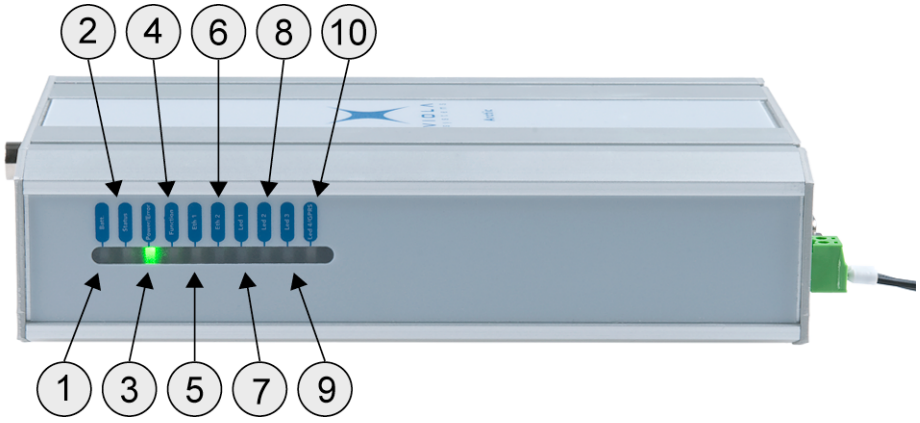


Table 2: LED Description

LED Number	LED	State	Description
1	Battery		Not connected
2	VPN	ON	VPN connection is up
		Blinking	VPN onnection is starting
		OFF	VPN connection is disabled
3	Power/Error	ON	Operating power is turned on
		OFF	Operating power is turned off
4	System Function	ON	Device is starting
		Blinking	Device is operating normally
5	Eth 1	ON	Ethernet link is up
		Blinking	Ethernet link is transferring data
		OFF	Ethernet link is down
6	Eth 2		Not connected
7	LED 1		Not connected
8	LED 2		Not connected
9	LED 3		Not connected
10	LED 4/GPRS	Blinking	Wireless communication is starting or transferring data
		OFF	Wireless communication is inactive

2.4 Product Information Label

The product information label on the underside of the Arctic contains the following information:

1. Product type
2. Serial number
3. MAC address

   The Ethernet address (MAC address) of the unit is printed on the product label. Each address code starts with the digits “00:06:70”, but the remaining six digits are unique for each unit.

Figure 7. *Product Information Label*

2.5 Firmware Version

The Arctic firmware version may be checked from the welcome page (**Log in the device > Welcome**).

3 Quick Installation

3.1 Connection Principle

Arctic has two network interfaces, Mobile WAN and Ethernet LAN. The WAN interfaces are used for connecting Arctic to public Internet or private APN. Ethernet LAN is used for connecting other Ethernet devices to Arctic 's local network.

3.2 Connecting cables

1. Verify that the power switch is in the OFF position.
2. Connect the Ethernet cable between Arctic (Ethernet LAN connector) and the computer used for the configuration.
3. Connect power supply to Arctic and toggle the power switch to ON position.
4. The power/error LED and function LED should turn on immediately after the power switch is turned on.
5. After the system has initialized, the LED starts to blink.

3.3 Logging in to Arctic

This section describes how to log in to Arctic using web configuration menu.

1. Configure the computer to use the same IP address space as Arctic (laptop IP for example 10.10.10.11 with netmask 255.0.0.0). Check with ping command.
2. Connect to the Arctic using the web browser. The default IP address of Arctic is 10.10.10.10 (netmask 255.0.0.0). Please make sure to connect to a HTTPS port (see the figure below).

Figure 8. *Browser https example*

Note!
The browser request for the certificates and can be ignored at this point.

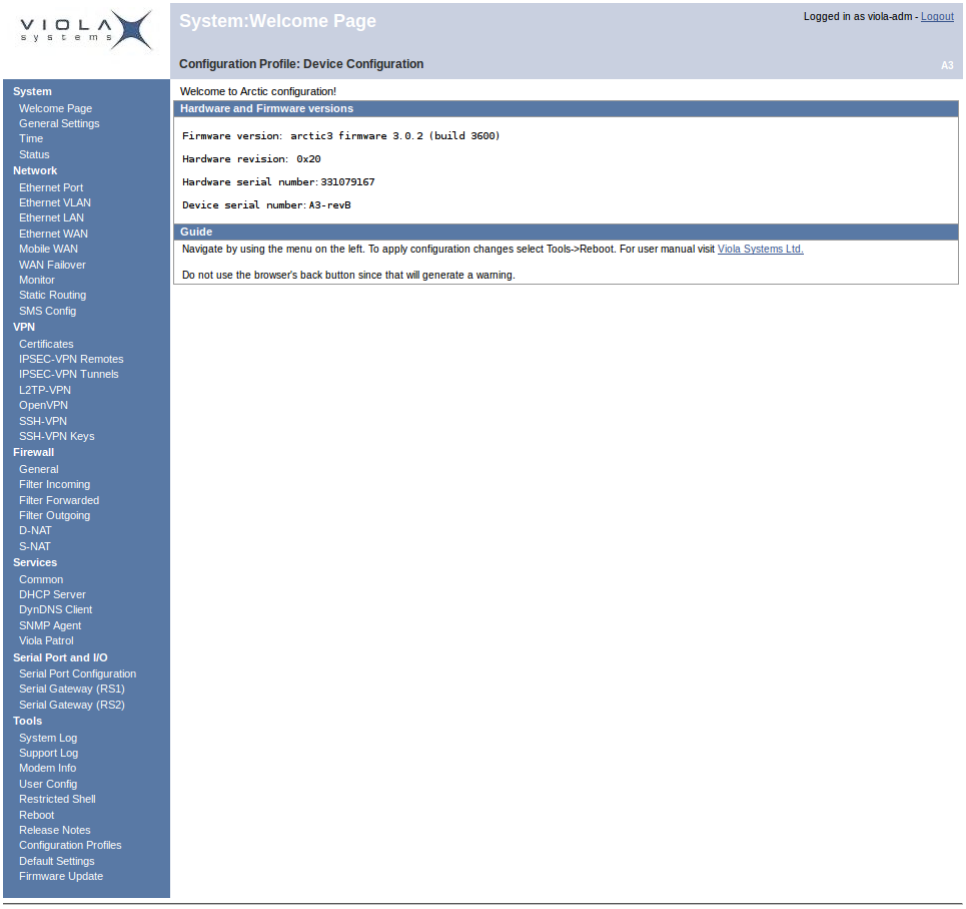
3. Enter the username and password and press **Login** button in the log-in screen. The actual screen depends on the used web browser.

Note!

Default username is **`viola-adm`** and default password is **`violam2m`**. It is recommended that the default password is changed before the product is connected to a public network.

4. White texts on the blue background on the left are the primary navigation texts and they are always visible on the screen. Individual screens may have their own tabs which split the configuration fields on larger screens. See the figure below.

Figure 9. *Configuration menu*



3.4 Configuring Ethernet LAN

1. Select **Network->Ethernet LAN** from the left menu.
2. Enter the preferred configuration to the configuration fields.
3. Press **Submit** button on the bottom to save the settings.

4. Select **Tools->Reboot** from the left menu and press **Reboot** button to restart the unit

   If the IP addresses are changed, the existing web browser connection hangs up once the settings are applied, so open a new connection to the new IP address (check the Ethernet cabling)
5. Connect to the Arctic with a new IP address.

3.5 Configuring Mobile WAN

1. Select **Network->Mobile WAN** from the left menu.
2. Enter the preferred configuration to the configuration fields.
3. Press Submit button on the bottom to save the settings.

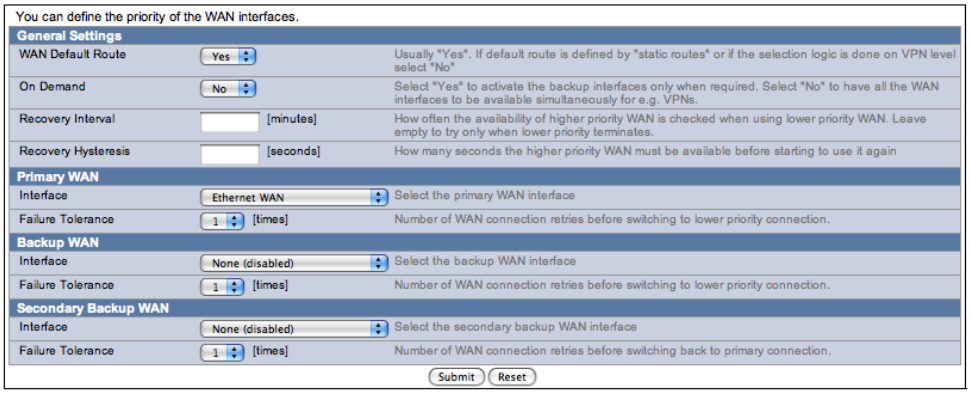
3.6 Configuring default gateway

1. Select **Network->WAN Failover** from the left menu.
2. Set **"WAN Default Route"="Yes".** This has to be enabled to use either WAN as default route interface.
3. If the mobile WAN has to be set as a default gateway, set **"Primary WAN Interface"="Mobile WAN".**
4. If Ethernet WAN has to be set as a default gateway:

   a) Select **Network > Ethernet port settings > WAN** .

   b) Set **"PrimaryWAN Interface"="EthernetWAN"**
5. If both Ethernet WAN and Mobile WAN configured, define the Backup WAN Interface. If the primary WAN interface comes down, Arctic automatically switches default route to backup WAN interface. The figure below shows example configuration where Ethernet WAN is configured as default route.

Figure 10. *Ethernet WAN default route example*


You can define the priority of the WAN interfaces.
General Settings
WAN Default Route
Yes
Usually "Yes". If default route is defined by "static routes" or if the selection logic is done on VPN level select "No"
On Demand
No
Select "Yes" to activate the backup interfaces only when required. Select "No" to have all the WAN interfaces to be available simultaneously for e.g. VPNs.
Recovery Interval
[minutes]
How often the availability of higher priority WAN is checked when using lower priority WAN. Leave empty to try only when lower priority terminates.
Recovery Hysteresis
[seconds]
How many seconds the higher priority WAN must be available before starting to use it again
Primary WAN
Interface
Ethernet WAN
Select the primary WAN interface
Failure Tolerance
1
[times]
Number of WAN connection retries before switching to lower priority connection.
Backup WAN
Interface
None (disabled)
Select the backup WAN interface
Failure Tolerance
1
[times]
Number of WAN connection retries before switching to lower priority connection.
Secondary Backup WAN
Interface
None (disabled)
Select the secondary backup WAN interface
Failure Tolerance
1
[times]
Number of WAN connection retries before switching back to primary connection.
Submit
Reset

6. Press **Submit** on the bottom to save the settings.
7. Select **Tools->Reboot** from the left menu and press **Reboot** button to restart the unit.

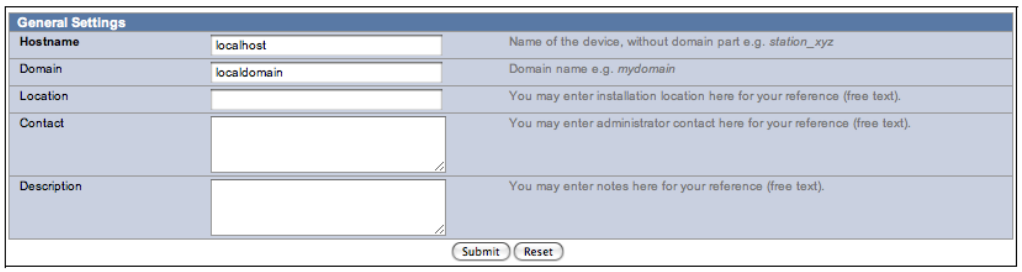
4 Network Configuration

4.1 Configuration screens

4.1.1 Host and domain names

Host and domain names can be set from the System General Settings screen.

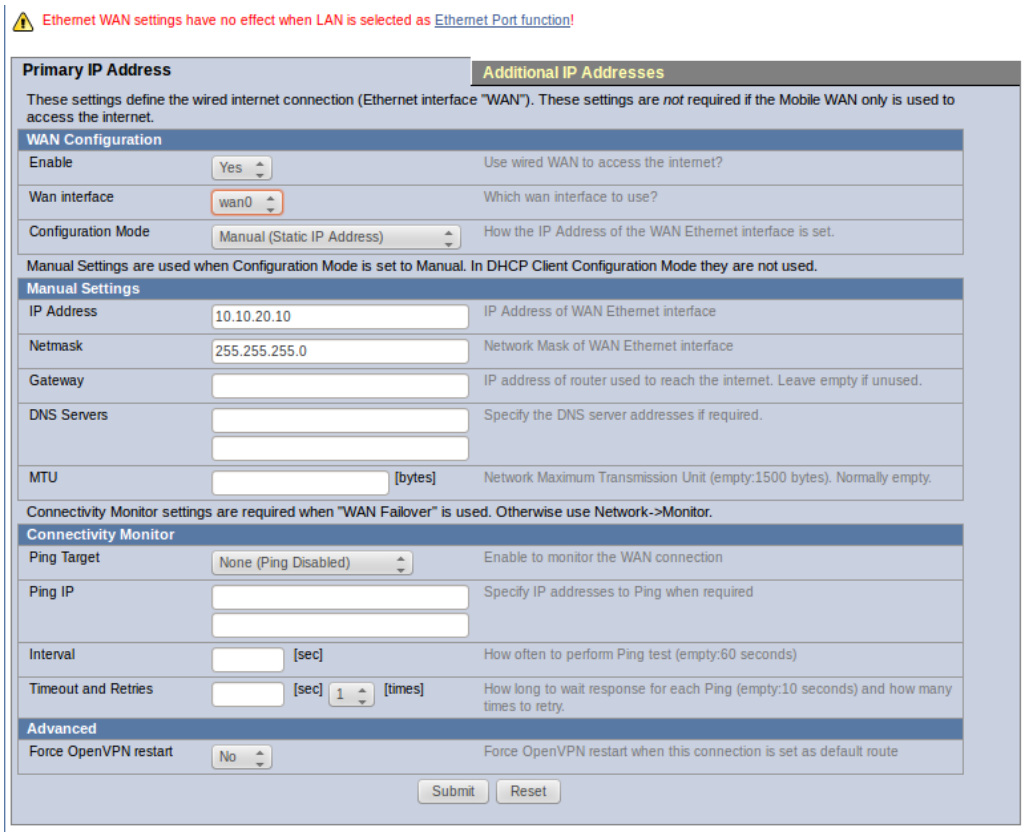
Figure 11. *General Settings*



4.1.2 Ethernet WAN

This screen configures the Ethernet WAN interface on Arctic .

Figure 12. *Ethernet WAN configuration*


Ethernet WAN settings have no effect when LAN is selected as Ethernet Port function!
Primary IP Address
Additional IP Addresses
These settings define the wired internet connection (Ethernet interface "WAN"). These settings are not required if the Mobile WAN only is used to access the internet.
WAN Configuration
Enable
Yes
Use wired WAN to access the internet?
Wan interface
wan0
Which wan interface to use?
Configuration Mode
Manual (Static IP Address)
How the IP Address of the WAN Ethernet interface is set.
Manual Settings are used when Configuration Mode is set to Manual. In DHCP Client Configuration Mode they are not used.
Manual Settings
IP Address
10.10.20.10
IP Address of WAN Ethernet interface
Netmask
255.255.255.0
Network Mask of WAN Ethernet interface
Gateway
IP address of router used to reach the internet. Leave empty if unused.
DNS Servers
Specify the DNS server addresses if required.
MTU
[bytes]
Network Maximum Transmission Unit (empty:1500 bytes). Normally empty.
Connectivity Monitor settings are required when "WAN Failover" is used. Otherwise use Network->Monitor.
Connectivity Monitor
Ping Target
None (Ping Disabled)
Enable to monitor the WAN connection
Ping IP
Specify IP addresses to Ping when required
Interval
[sec]
How often to perform Ping test (empty:60 seconds)
Timeout and Retries
[sec]
1
[times]
How long to wait response for each Ping (empty:10 seconds) and how many times to retry.
Advanced
Force OpenVPN restart
No
Force OpenVPN restart when this connection is set as default route
Submit
Reset

Connectivity Monitor settings are used when WAN redundancy functionality is required. Monitor keeps checking the connection to the given remote host to

determine the network status. If the ping does not get an answer for a given time window, it informs the WAN switch logic to try the secondary interface.

If the WAN redundancy is implemented by using two separated Ethernet connections with different gateways, the Backup Gateway parameter needs to be configured towards the correct backup gateway. Backup Gateway parameter is not needed if WAN redundancy is implemented with wireless connection.

See section *WAN Failover* on page 21 for more details about WAN redundancy.

4.1.3 Mobile WAN

This screen configures the Mobile WAN interface on Arctic .

Figure 13. *Mobile WAN configuration*

To configure the mobile WAN, enable the connection by selecting "Enable"="Yes" on the top of the page and enter PIN code if set, APN name and authentication details if needed.

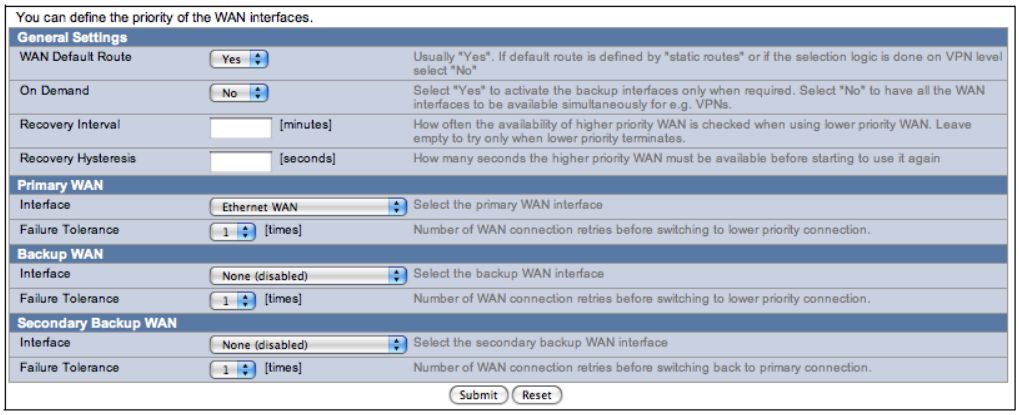
If Arctic acts as a wireless router to Ethernet devices and DNS is needed, enter DNS configuration as well. When ready, press the Submit button on the bottom of the page to save settings.

Arctic need to be restarted before the mobile WAN configuration is active.

4.1.4 WAN Failover

WAN Failover screen configures the default gateway settings on the Arctic .

Figure 14. *WAN Failover configuration*


You can define the priority of the WAN interfaces.
General Settings
WAN Default Route
Yes
Usually "Yes". If default route is defined by "static routes" or if the selection logic is done on VPN level select "No"
On Demand
No
Select "Yes" to activate the backup interfaces only when required. Select "No" to have all the WAN interfaces to be available simultaneously for e.g. VPNs.
Recovery Interval
[minutes]
How often the availability of higher priority WAN is checked when using lower priority WAN. Leave empty to try only when lower priority terminates.
Recovery Hysteresis
[seconds]
How many seconds the higher priority WAN must be available before starting to use it again
Primary WAN
Interface
Ethernet WAN
Select the primary WAN interface
Failure Tolerance
1
[times]
Number of WAN connection retries before switching to lower priority connection.
Backup WAN
Interface
None (disabled)
Select the backup WAN interface
Failure Tolerance
1
[times]
Number of WAN connection retries before switching to lower priority connection.
Secondary Backup WAN
Interface
None (disabled)
Select the secondary backup WAN interface
Failure Tolerance
1
[times]
Number of WAN connection retries before switching back to primary connection.
Submit
Reset

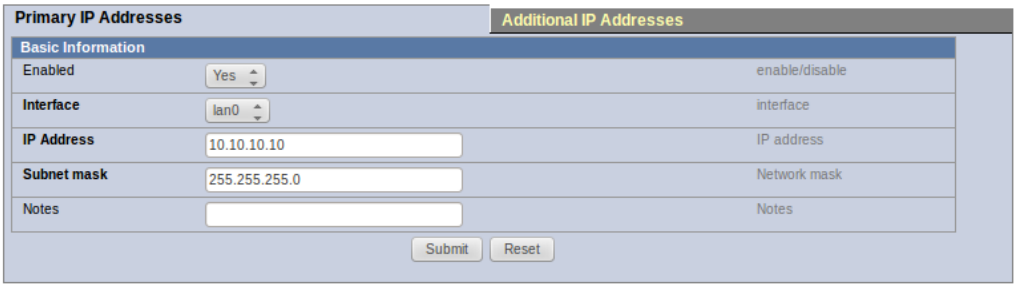
To enable any default routes, set **"WAN Default Route"="Yes"**. Any route settings are not effective if this parameter is not enabled.

Set **"On Demand"="Yes"** if the backup WAN interface to come up only when primary interface goes down. Disable if both wireless and wired WAN interfaces have to be up all the time.

4.1.5 Ethernet LAN

This screen configures the Ethernet LAN interface on Arctic .

Figure 15. *Ethernet LAN Configuration*

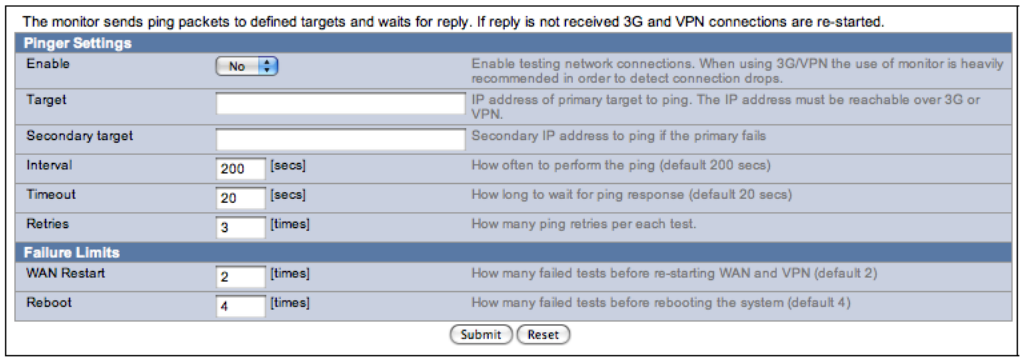


Ethernet LAN configuration is very simple. It configures the IP address for the Ethernet LAN interface.

4.1.6 Network monitor

This screen configures the interface connectivity monitor on Arctic .

Figure 16. *Network monitor configuration*


The monitor sends ping packets to defined targets and waits for reply. If reply is not received 3G and VPN connections are re-started.
Pinger Settings
Enable
No
Enable testing network connections. When using 3G/VPN the use of monitor is heavily recommended in order to detect connection drops.
Target
IP address of primary target to ping. The IP address must be reachable over 3G or VPN.
Secondary target
Secondary IP address to ping if the primary fails
Interval
200
[secs]
How often to perform the ping (default 200 secs)
Timeout
20
[secs]
How long to wait for ping response (default 20 secs)
Retries
3
[times]
How many ping retries per each test.
Failure Limits
WAN Restart
2
[times]
How many failed tests before re-starting WAN and VPN (default 2)
Reboot
4
[times]
How many failed tests before rebooting the system (default 4)
Submit
Reset

When using VPN, the usage of the monitor is heavily recommended to detect the connection drops.

4.2 Routing

4.2.1 Routing parameters

There are multiple configuration options that define the routing on Arctic :

- Ethernet WAN - Gateway (IP address)
  - IP address of router used to reach the internet. Leave empty if unused.
- WAN Failover - WAN Default Route (selection: Yes/No)
  - Usually "Yes" if default route is defined by "static routes". If the selection logic is done on VPN level select "No"
- WAN Failover - On Demand (selection: Yes/No)
  - Select "Yes" to activate the backup interfaces only when required. Select "No" to have all the WAN interfaces to be available simultaneously for e.g. VPNs.
- WAN Failover - Primary WAN Interface (selection: None/Mobile WAN/ Ethernet WAN/Ethernet WAN Secondary)
- WAN Failover - Backup WAN Interface(selection: None/Mobile WAN/ Ethernet WAN)

- WAN Failover - Secondary Backup WAN Interface (selection: None/Mobile WAN/Ethernet WAN/Ethernet WAN Secondary)
  - These three settings configure the high level default gateways. Must be configured to enable default route.
- OpenVPN Client Settings - Interface (selection: Any WAN/Ethernet WAN/ Wireless WAN/Ethernet LAN)
  - Which Interface to use for connection
- OpenVPN Client Settings - Routing mode (selection: None/host/net/default route)
  - This defines how the routing is configured with OpenVPN. See OpenVPN application note.

4.2.2 Default route

Default route can be configured from WAN Failover screen. See section *WAN Failover* on page 21.

4.2.3 WAN redundancy/failover

To configure redundancy between WAN interfaces, configure multiple WAN interfaces to WAN Failover. See section *WAN Failover* on page 21.

4.2.4 Routing serial <-> Ethernet

See section *Configuring serial gateway* on page 26 for configuring serial gateway.

4.3 Network services

4.3.1 DNS proxy

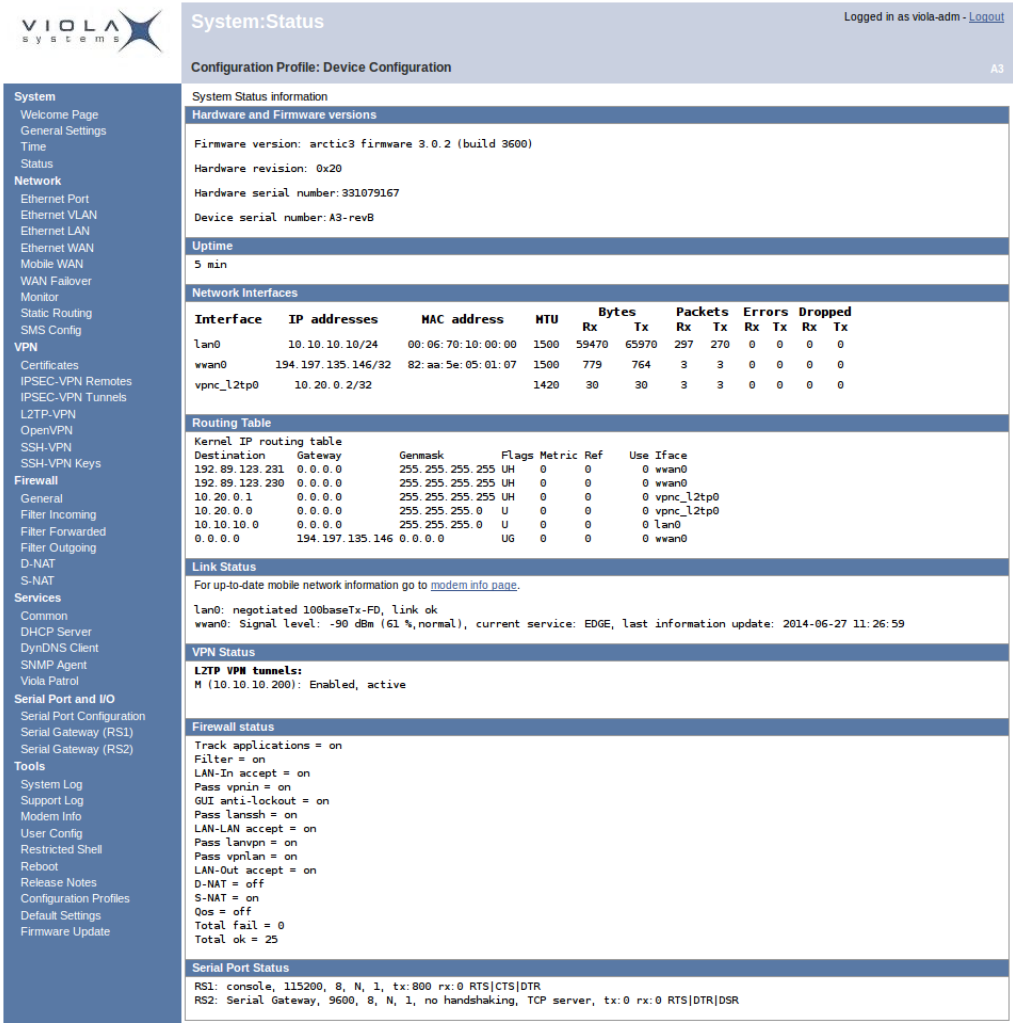
To use this feature, configure the device to use Arctic Ethernet LAN IP address as its DNS server. This way, the DNS queries from the device get routed through the Arctic .

4.4 Network status information

4.4.1 System status screen

Network status information can be seen from **System > Status screen** .

Figure 17. *Network status screen*



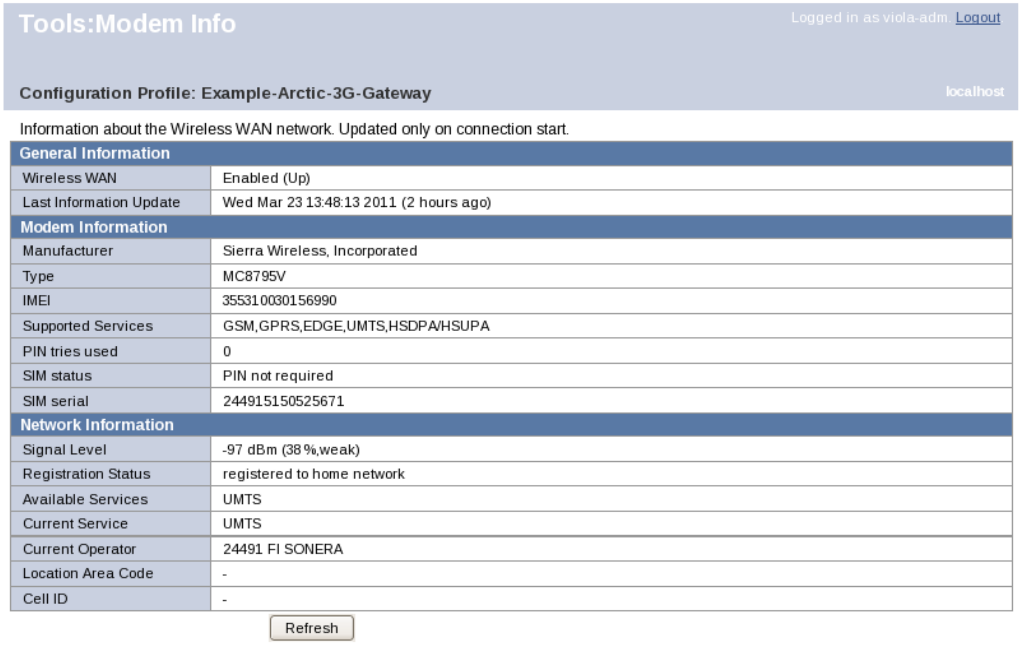
4.4.2 Mobile WAN status LEDs

See *Table 2: LED Description* on page 14.

4.4.3 Modem info screen

In troubleshooting situations, checking the system logs helps to identify the problem. Also modem info page can be used to check the status of the wireless modem.

Figure 18. *Modem info screen*



Tools:Modem Info

Logged in as viola-adm. Logout

Configuration Profile: Example-Arctic-3G-Gateway

localhost

Information about the Wireless WAN network. Updated only on connection start.

General Information	
Wireless WAN	Enabled (Up)
Last Information Update	Wed Mar 23 13:48:13 2011 (2 hours ago)
Modem Information	
Manufacturer	Sierra Wireless, Incorporated
Type	MC8795V
IMEI	355310030156990
Supported Services	GSM,GPRS,EDGE,UMTS,HSDPA/HSUPA
PIN tries used	0
SIM status	PIN not required
SIM serial	244915150525671
Network Information	
Signal Level	-97 dBm (38 %,weak)
Registration Status	registered to home network
Available Services	UMTS
Current Service	UMTS
Current Operator	24491 FI SONERA
Location Area Code	-
Cell ID	-

Refresh

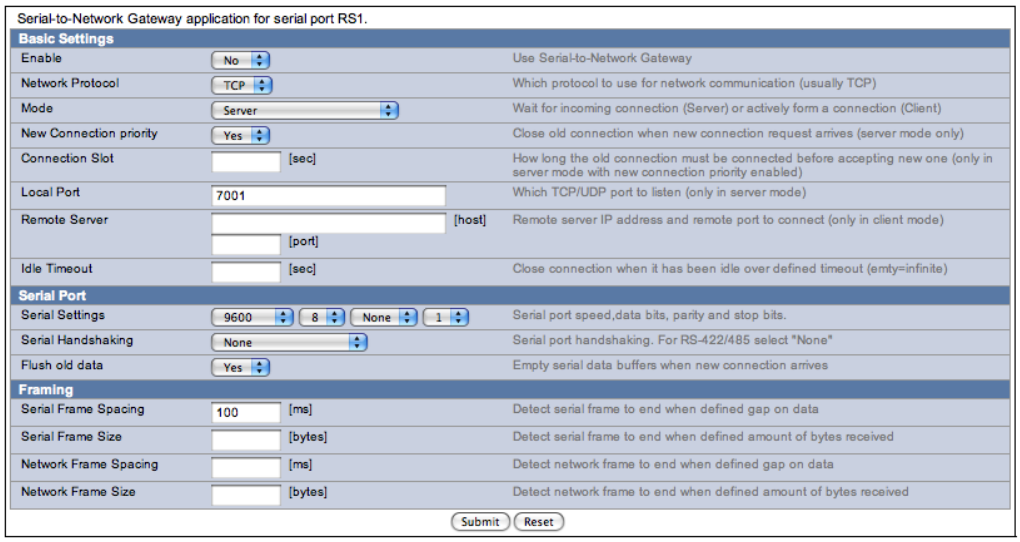
5 Serial Port Configuration

5.1 Configuring serial gateway

This section describes how to configure serial <-> IP functionality.

The serial gateway feature enables data from the serial port attached device to be routed to Ethernet/mobile network (serial over IP) and vice versa. Serial gateway processes the transmitted data transparently and does not alter it any way except for buffering it for transmission. Because of the transparent communication, any protocols can be used in actual communication between nodes.

Figure 19. *Serial gateway configuration screen*



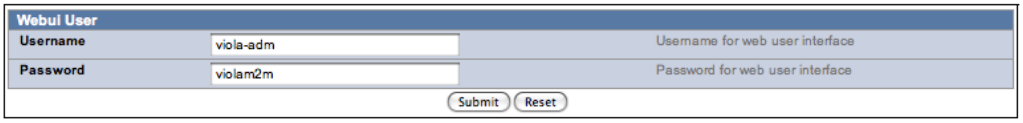
Serial gateway configuration depends on used protocols.

6 Additional System Configuration

6.1 Changing system password

Username and password can be changed from **Tools > User Config** screen. It is always recommended to change the password from the factory default when the Arctic is connected to a public network.

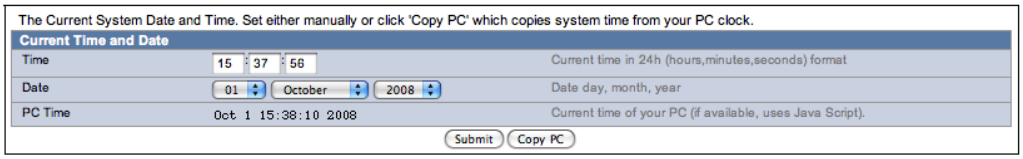
Figure 20. *User Config screen*



6.2 Date and time

Date and time can be changed from **System->Time** screen. Date and time can be configured either manually entering the time or automatically from connected PC.

Figure 21. *System time configuration screen*


The Current System Date and Time. Set either manually or click 'Copy PC' which copies system time from your PC clock.
Current Time and Date
Time
15 37 56
Current time in 24h (hours,minutes,seconds) format
Date
01 October 2008
Date day, month, year
PC Time
Oct 1 15:38:10 2008
Current time of your PC (if available, uses Java Script).
Submit
Copy PC

To set time manually, enter the time and then press Submit button.

To copy time from PC, press Copy PC button and answer "Yes" to question about changing time. Note that the PC may not necessarily have correct time set and that needs validation. Also note that the copy functionality requires JavaScript support from the browser.

6.3 System log

System log is visible on the Tools->System Log screen. To refresh the system log, use web browser reload button.

6.4 Factory default settings

Factory default settings can be applied by restarting the unit pressing down reset button until the LEDs blink.

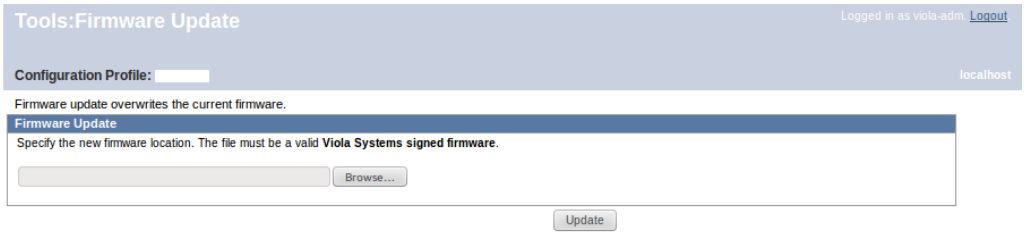
To restore factory default settings, go to **Tools > Default settings** .

6.5 Firmware update

Current running firmware version can be viewed from the **System->Status** screen.

Arctic firmware can be updated from the **Tools->Firmware Update** screen.

Figure 22. *Firmware update screen*



Firmware update erases all the settings on the unit to the factory defaults. It is recommended to create backup from the old configuration before attempting to update the firmware.

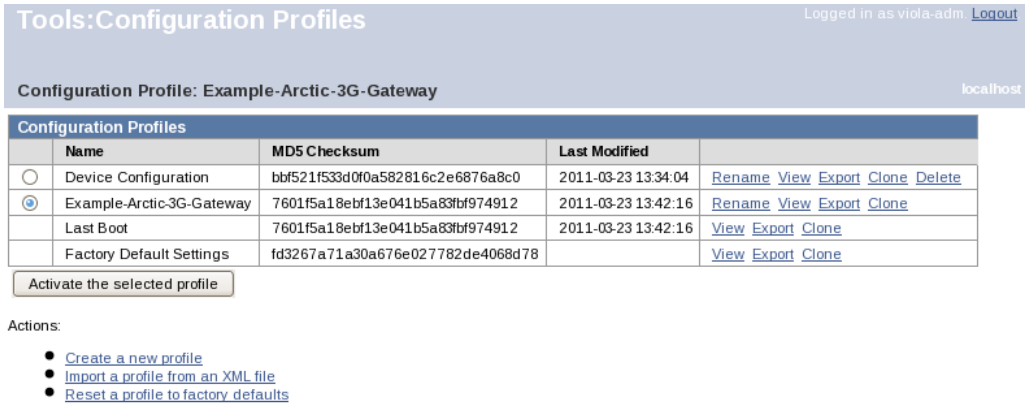
To update firmware:

1. Verify for a valid firmware on the PC before attempting to update the firmware.
2. Select **Select file** button to open file browsing dialog. The actual dialog depends on the used browser.
3. Select the updated firmware from the file dialog and return to the firmware update screen.
4. Press **Update** button to start the firmware update.
5. Confirm the update.
6. The update takes a few minutes and the unit restarts with factory default settings when the update is completed.

6.6 Configuration profiles

Profiles can be configured and saved for future use. Several profiles are created and selected for the activation. It is possible to import, export and clone profiles, and also reset them to factory default settings.

Figure 23. *Configuration profiles*



7 Troubleshooting

Q: Wireless WAN is not coming up

A: Check settings (*Mobile WAN* on page 20), SIM card and signal level.

Q: OpenVPN is not working

A: For more information, see OpenVPN application note. Send a request to support@violasystems.com for the note.

Q: Serial ports are not working

A: For more information, see serial port chapter notes. Verify DIP switch configuration if RS-422 or 485 modes are being used.

Q: Can not access web user interface

A: Web user interface uses HTTPS for secure web access and it must be specified on the web browser address field like in this example: https://10.10.10.10.

Q: Cannot access the Internet with laptop connected to Arctic

A: Testing the wireless connection:

1. Configure wireless connection and verify if it connected to the network
2. Connect a laptop to Ethernet LAN
3. Check that S-NAT rule on the firewall is set as "Action"="Masquerade" and "Destination Inter- face"="Mobile WAN".
4. Check that DNS Proxy is enabled from **Services > Common** screen.
5. Configure network settings on laptop to use Arctic Ethernet LAN address as gateway and DNS server.

With these setting, the Internet should be accessible on the laptop.

Specifications

Table 3: Technical specifications

Processor	32 bit RISC
Memory (RAM)	128MB
Hard Drive (flash)	128MB
Input voltage (nominal)	12-48VDC
Power consumption	7W max
Power connector	Phoenix Contact 2-pin
Casing	Aluminium sheet
Operating temperature	-30 - 70 °C
Storage temperature	-40 ... +85 C
Humidity	0 ... 85% RH
Network connection	10/100M
Approvals	CE
Size	180 x 110 x 45 mm
Weight	0.7 kg

Table 4: Wireless specifications

Networks	Frequencies	Maximum data rates
Arctic 3G Lite C-1230 (Europe)	GPRS/EDGE: 1900/1800/900/850 MHz 3G (WCDMA): 2100/900 MHz	Air interface HSPA+ Downlink 14.4 Mbps max Uplink 5.76 Mbps max
Arctic 3G Lite C-1240 (Americas)	GPRS/EDGE: 1900/1800/900/850 MHz 3G (WCDMA): 2100/1900/850 MHz	Air interface HSPA+ Downlink 14.4Mbps max Uplink 5.76 Mbps max
Arctic LTE Lite C-1260	GPRS/EDGE: 1900/1800/900/850 MHz 3G (WCDMA): 2100/1900/900/850 MHz 4G (LTE): 2600/2100/1800/ 900/800 MHz	Air interface LTE Downlink 100 Mbps max Uplink 50 Mbps max

Antenna connector type is SMA (male).

Table 5: Application serial port specifications

Serial mode (RS1)	RS-232 / Console
Serial mode (RS2)	RS-232 / 422 / 485
Baud rate	300 - 460800
Data bit	5 / 6 / 7 / 8
Parity	None / Even / Odd
Stop bits	1 / 2
Flow control	None / Hardware (RTS/CTS) / Software (XON/XOFF)

Techical specifications can be changed without notification.

Limited Warranty

Coverage

Viola Systems warrants this hardware product to be free from defects in materials and workmanship for the warranty period. This non-transferable, limited warranty is only for the first end-user purchaser. The warranty begins on the date of purchase and lasts for the period specified below:

Arctic 3G Lite and Arctic LTE Lite: one (1) year

Excluded Products and Problems

This warranty does not apply to: (a) Viola Systems software products; (b) expendable components such as cables and connectors; or (c) third party products, hardware or software, supplied with the warranted product. Viola Systems makes no warranty of any kind on such products which, if included, are provided "AS IS." Excluded is damage caused by accident, misuse, abuse, unusually heavy use, or external environmental causes.

Remedies

The sole and exclusive remedy for a covered defect is repair or replacement of the defective product, at Viola Systems' sole option and expense, and Viola Systems may use a new or refurbished parts or products to do so. If Viola Systems is unable to repair or replace a defective product, an alternate exclusive remedy shall be a refund of the original purchase price.

The above is Viola Systems' entire obligation to you under this warranty. IN NO EVENT SHALL VIOLA SYSTEMS BE LIABLE FOR INDIRECT, INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, USE, OR PROFITS EVEN IF VIOLA SYSTEMS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. In no event shall Viola Systems' liability exceed the original purchase price of the device server. Some states or countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply.

Obtaining Warranty Service

It must be notified to Viola Systems within the warranty period to receive warranty service. During the warranty period, Viola Systems will repair or replace, at its option, any defective products or parts at no additional charge, provided that the product is returned, shipping prepaid, to Viola Systems. All replaced parts and products become the property of Viola Systems. Before returning any product for repair, customers are required to contact the Viola Systems.

Technical Support

Contacting Technical Support

Phone: +358 20 1226 226

Fax: +358 20 1226 220

E-mail: support@violasystems.com

Internet: http://www.violasystems.com

Recording Arctic Information

Before contacting our Technical Support staff, please record (if possible) the following information about the Arctic product:

Product name:

_____

Serial no:

_____

Note the status of the Arctic in the space below before contacting technical support. Include information about error messages, diagnostic test results, and problems with specific applications.

_____

_____

_____